

REAL TIME FACE MASK DETECTION USING CNN

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ABSTRACT

Corona virus disease 2019 has become a major health problem. It is spreading very widely due to its contact transparent behavior. So WHO declared to wear mask in crowded areas as a prevention method. Some of the areas the diseases become widely spread out due to improper wearing of facial mask. So to overcome this problem we required an efficient mask monitoring system. The main aim of our project is to develop an efficient real time face mask detection. There are so many ways to develop in this system, in this paper introduce a real time face mask detection system by using a convolutional neural network (CNN)

Keywords: Corona Virus Disease 2019, Face Mask Detection, CNN, Machine Learning.

I. INTRODUCTION

Face mask detection is a challenging task. So many countries develop a rule like “no mask, no entry. because WHO declared wearing mask and keeping social distance is the best prevention method against this diseases. We know in face mask detection system identifying which person correctly wear mask or not in a public areas The main application of real time face mask detection system are applicable in the areas such as hospital, Education institution, airport system etc. By the development of this system we can avoiding the need of security in this areas. Here real time face mask detection is based on a convolutional neural method. In this paper aimed at to design a real time face mask dection model. Here CCTV cameras are used for real time viedo footage. Mask detection model is created by using a MobileNetSSD. we know that SSD is a single short detector.it takes multiple objects with in the single image. In this paper using a real time video from a webcam and find out the masked and non-masked people in a public places and also providing an alert system for their recognition.

II. METHODOLOGY

As a part of this work, collected images of masked and non-masked face images from my class. In order to increase the number of collected images various data augmentation methods are used. Then train a simple CNN with these augmented data set. After that increased the accuracy of the In this paper I used to CNN approach. We know that convolutional neural networks are different from other network by their performances with images. Mainly they have 3 layers such as convolutional layer. Pooling layer and followed by a fully connected layer. Here convolutional layer are considered as first layer.in convolutional layer convolutional operation takes place. convoution operation is nothing but it is a multiplication of image by a filter. During convolution process we can extract the maximum features. After the convolutional operation max pooling operation is carried out for down sampling purpose. Through the proposed system initially resizing the input dada into 220*220 array format. Then finally create a model .Using the training data set train the model and also checking it for testing images. We can say that when the validation accuracy is almost same as the training accuracy, then our model become efficient. Finally we can obtain the mask detection. In figure 1 describe the face mask detection block diagram. Here initially creating mask detector model, and load face mask classifier. Then detect faces from viedo stream. Viedo is the collection of multiple images .then by using facial land marks allowing us to localize the eyes,nose,mouth etc,onces we know where in the image the faces helps to extract the region of interest(ROI).Next step is to extract each faces ROI,finally we can determine the mask or not.

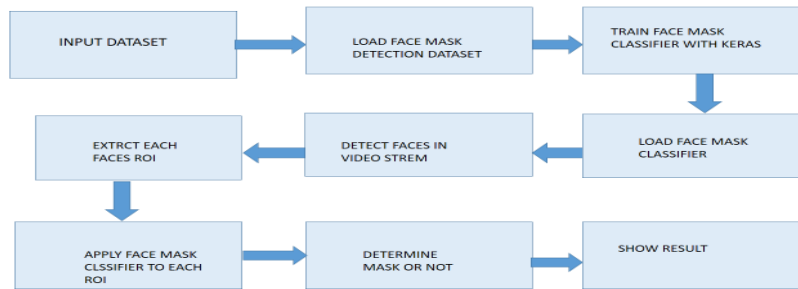


Figure 1: Block diagram of face mask detection

III. IMPLEMENTATION

Actually in this paper aimed at to identified the masked person and non-masked person in a public places. Feature extraction is done by the convolutional neural networks(CNN) By training the convolutional neural network with thousands of images. In this section containing the implementation steps

- Data collection and pre-processing
- Model development and training
- Model testing
- Model implementation

3.1. Data collection and pre-processing

I collected the dataset of with mask and without mask. Here SSD algorithm is used for face mask detection. The dataset consist of totally 2965 images. The datasets are labeled with mask and without mask.so 20% images used for testing purpose and 80% images used for training purpose. In image pre-processing step, the image is taken from the CCTV footage is transformed in to gray scale. Because gray scale image is used for a single pixel storage .Hence we can easily find out the face mask detection.

3.2. Model building and Training

The learning model is based on convolutional neural network. The network containing input layer, hidden layer and output layer. The convolutional layer followed by a pooling layer for the maximum feature extraction from a given image, Our model is tuned using Mobil Net v2.which is a high and efficient architecture compared to other network. We used 80% of our data set for training purpose. During training the model will absorb the maximum features of input images. The ssd helps to identifying the multiple faces in a single image. That is if more than one faces in a video or an image, ssd helps to recognize person having mask or not using a rectangular box.

Model Testing

Our model is trained by using 20% data's of our data set. The testing data set include both with and without mask images. During testing process a person is identified the presence of mask by using a green rectangular box and presence of without mask indicated by a red rectangular box.

Model implementation

The proposed system uses with camera to automatically track public spaces in real-time to prevent the spread of corona. The trained model with the custom data set is installed, and the camera is attached to it. The camera feeds real-time videos of public places to the model, which continuously and automatically monitors public places and detects whether or not those people wear masks.

IV. RESULTS

When some of the static test images were tested the result of image classification is as shown below.

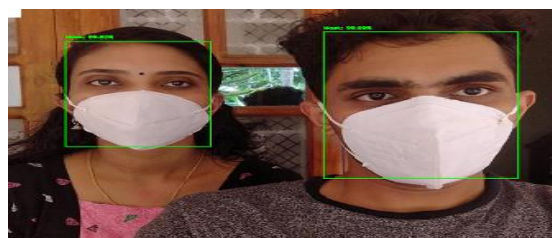




Figure 2: Output using static multiple images

V. CONCLUSION

We know that in this world the death rate increases rapidly due to corona virus. So in this paper, the system plays a crucial role in the case of recent virus outbreak. Here to develop a convolutional neural network to predict face mask detection. The SSD algorithm helps to detection of multiple faces from a scene. This automated real time face mask detection system to provide the accurate detection of persons with face mask and without face mask, thereby reducing health risk.

VI. REFERENCES

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